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ORIGINAL ARTICLE

Yield of transbronchial needle aspiration of mediastinal lymph nodes of 36 cases

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KEYWORDS

Transbronchial lymph node aspiration;
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Abstract *Background:* Besides clarifying the etiology of unidentified lymphadenomegaly, puncturing hilar and mediastinal lymph nodes by a flexible bronchoscopic needle is an aid in diagnosing and staging bronchogenic cancer or other metastatic cancers and diagnosing other inflammatory diseases i.e. sarcoidosis tuberculosis.

Objective: Our study had the principal objective to evaluate the positivity of transbronchial needle aspiration (TBNA).

Method: We retrospectively reviewed 36 patients using bronchoscopy and histopathological reports and corresponding patients chart over 3 years from January, 2009 to December, 2012 at the department of chest disease at Mansoura University.

Results: A total of 38 underwent FFB procedures. 2 (5%) patients were excluded due to incomplete follow up data.

The yield of TBNA was positive in 22 patients (61%), of them 9 patients (25%) were positive for malignancy and 13 patients (36%) were diagnosed as inflammatory disease i.e. tuberculosis or sarcoidosis.

Only 3 patients (8%) had documented bleeding after TBNA and, bleeding stopped spontaneously. No mortality was reported due to this procedure.

Conclusion: Our study indicated that this method is safe, easy to perform, with a minimum of complications and useful for the diagnosis and staging of pulmonary neoplasms and mediastinal lymph node enlargement.

Introduction

Transbronchial needle aspiration (TBNA) is a valuable technique for sampling mediastinal lymph node and pulmonary parenchymal lesion. The diagnostic yield of TBNA varies

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widely in reported cases ranging from 20% to 90%. It is a safe, cheap and minimally invasive procedure, performed via a flexible bronchoscope [1–7].

Indications for TBNA are any enlarged lymph node lining the trachea or main bronchi or a parenchymal lesion abutting the main or segmental bronchi out lined by a CT scan or X-ray chest. The gold standard for histologic diagnosis is mediastinoscopy, mediastinotomy or an open lung biopsy however these procedures are invasive and complications can be serious [8].

The objective of this study was to report our 3 years experience with diagnostic yield and complication of the transbronchial needle aspiration biopsy at Mansoura University Chest Department.

Methods

Study subjects

All patients were retrospectively reviewed using bronchoscopy and histopathological reports and corresponding patient chart over 3 years from January, 2009 to December, 2012 at the department of chest disease at Mansoura University.

Each FFB was completed by a pulmonary physician under a consultant's supervision at the endoscopy unit. Demographic data were recorded including: age, gender, indication for procedure, pre-medication, radiographic findings, bronchoscopy findings, pathological diagnosis, and complications of bronchoscopy.

All selected patients had no accessible peripheral lymph node, not previously diagnosed as malignancy or other inflammatory diseases like tuberculosis or sarcoidosis. They had tracheobronchial wall adjacent lymph node. A written consent was obtained from each patient prior to the procedure.

Bronchoscopy procedure

Patients were maintained without oral intake for at least 6 h prior to the procedure. Platelet count prothrombin time (PT) and activated partial thromboplastin time (aPTT) were extracted before the procedure and with normal values.

The procedure was performed using a flexible fiberoptic bronchoscopy (Pentax FV_18v, Japan) on the patient in supine position. Just before insertion of the bronchoscope, 2–3 ml of 2% viscous lidocaine was applied to the nose or lidocaine spray into oral cavity. Midazolam (0.07 mg/kg) was administered intravenously in incremental doses to achieve conscious sedation, before and after the insertion of the bronchoscope.

All patients were supplemented with oxygen through nasal cannula and were continuously monitored with electrocardiogram and pulse oximetry. Liquid xylocaine 2% was administered through the bronchoscope directly to the vocal cords and the bronchial tree as needed. Bronchoalveolar lavage (BAL), transbronchial needle aspiration (TBNA; lymph nodes or lung), bronchial mucosa biopsy (TBB), were performed as decided by the bronchoscopist. Transbronchial needle aspiration (TBNA) was performed blindly and as per the international recommendations [9]. Postbronchospy sputum was collected and sent for sputum cytology. Post-bronchoscopy chest X-ray and ABG were performed routinely 4 h after TBLB. In situations where TBNA has to be performed, before bronchial mucosa biopsy to avoid contamination. The TBNA needles used were the 20-gauge and 19-gauge needles and needle length 12 mm. The TBNA needle was advanced to penetrate through the intercartilaginous space. Then suction was applied with a 20-ml syringe and the needle was moved in and out by 3–4 mm. Complications were categorized as minor or major according to the BTS guidelines [9]. All bronchoscopies were done without fluoroscopy. Biopsy specimens were fixed in formaldehyde solution, embedded in paraffin, and BAL was centrifuged and was subsequently fixed and stained on a glass slide. Direct smear technique was used for the preparation of TBNA specimens. The specimen was smeared on a glass slide applying pressure from the same syringe and immediately covered with a second slide and while exerting gentle continuous pressure the slides were drawn apart and fixed with 95% alcohol.

Statistical analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 16 software package. Continuous variable was expressed as mean ± SD categorical variables were tested using Chi-square test. Significance was taken at 0.05.

Results

A total of 38 underwent FFB procedures. 2 (5%) patients were excluded due to incomplete follow up data.

The mean age of 36 was 48 ± 13 and 19 (53%) were males, cigarette smokers account for 16 (44%) of studied patients. 18 (50%) had received medication pre procedure in the form of oral steroid and other non specific medication.

Malignancy was suspected through history and radiological finding in 10 (28%) of the studied groups.

8 patients (22%) of the studied group had posterior mediastinal lesion, 6 patients (17%) had anterior mediastinal lesion, 17 patients (47%) had mediastinal and subcarnial lymph node and 5 patients (14%) had both lymph node enlargement and lung infiltration (see Table 1).

The yield of TBNA was positive in 22 patients (61%), of them 9 patients (25%) were positive for malignancy and 13 patients (36%) were diagnosed as inflammatory disease i.e.

Table 1 Diagnostic yield of various bronchoscopy procedures.

	Total no. of procedures performed (N)	% of procedures performed in all patients (n)	No. of positive results (n)	Yield ($n/N \times 100\%$)
TBNA	36	100	22	61
BAL	36	100	18	50
Bronchial mucosa biopsy	22	61	14	63
Sputum	18	50	6	33

tuberculosis or sarcoidosis. BAL was a positive diagnosis of malignancy performed in 18 patients (50%) and presented as follows: malignancy 12 (33%), inflammatory 6 (17%).

Bronchial mucosa biopsy was done only to 22 (61%) patients of the studied cases and its yield was positive in 14 (63%) as follows: 6 (27%) malignant and 8 (36%) inflammatory.

Post bronchoscopy sputum cytology was performed in 18 patients (50%) and its yield was positive in 6 cases (33%) two of them (11%) were malignant the last four (22%) were inflammatory.

Mean of number of slides used to diagnose TBNA showed 4 ± 1.8 with a significant difference between them.

There was no correlation between number of slides used in TBNA and diagnostic yield of TBNA.

Only 3 patients (8%) had documented bleeding after TBNA and, bleeding stopped spontaneously. No mortality was reported due to this procedure.

Discussion

Transbronchial needle aspiration, which was first developed by Schieppati [10], and later used with the fiberoptic bronchoscope [11], is now beginning to gain acceptance as an essential tool to stage the extent of mediastinal lymph node involvement in malignant disease.

The positive yield obtained in our study was 61%, whereas results from other studies have demonstrated a positive yield of 45–96% [1,3,11,12].

The varied positive yield obtained from different studies suggests that transbronchial needle aspiration was not only operator-dependent [13], but also depended on other factors to achieve high yields. These factors are likely to include the type of needle, technique, tomographic evaluation, tissue preparation, tissue interpretation, nodal site and size [14].

In our study it was reported that lymph node aspiration was not separate. According to the site of lymph node and size it is required to examine each aspirate separately so further studies are needed to determine the yield of each lymph node. This suggests that separation of the transbronchial needle aspiration specimens according to different nodal stations may be helpful in staging lung cancer and determining appropriate subsequent treatment.

In our study there was no correlation between numbers of slides used in TBNA and diagnostic yield. Tissue preparation and interpretation are important factors to consider for achieving a high TBNA diagnostic yield [15].

With regard to sample preparation, two widely practiced methods were compared prospectively by Diacon et al. [16] to determine which has a higher yield. In the first method, the specimens were flushed into a container and transported as a fluid suspension to the laboratory, where they were processed further (called the fluid technique), while in the second method, the specimen was directly placed onto a slide, and immediately smeared and spray-fixed (called the direct technique). They reported that the direct technique had a better yield overall than the fluid technique ($p < 0.01$). The direct technique is superior because the fluid technique may have resulted in cell loss during transportation and laboratory preparation.

We reported only 3 patients (8%) out of 36 patients had documented bleeding after TBNA and, bleeding stopped spontaneously. No mortality was reported due to this procedure.

Therefore, bronchoscopists should consider TBNA as one of the routine sampling procedures besides bronchial brushing and endobronchial forceps biopsy, as serious complications following TBNA are rare.

Since it was adapted for use with flexible bronchoscopy, transbronchial needle aspiration is a procedure that continues to undergo improvisation to achieve higher diagnostic yields. These include guidance techniques, such as CT-fluoroscopy guided TBNA [17] and endobronchial ultrasound-guided TBNA [18].

As the trend moves toward minimally invasive techniques, TBNA is a valuable tool to diagnose lesions in the mediastinum and lung; without subjecting the patient to surgery. As techniques advance with time, so must our skills for surely, the tool is only as good as its operator.

In malignancy early diagnosis and staging with less invasive technique through many techniques by bronchoscopy play important roles in determining appropriate treatment and thus, influence the prognosis of this disease.

Conflict of interest

We have no conflict of interest to declare.

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